

In the United States Court of Federal Claims

No. 15-945C
(Filed: August 22, 2023)
(Re-issued: November 30, 2023)¹

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4DD HOLDINGS, LLC, and
T4 DATA GROUP, LLC,

Plaintiffs,

v.

THE UNITED STATES,
Defendant,

and

IMMIX TECHNOLOGY, INC.,

Third-Party.

* * * * *

Roman M. Silberfeld, Los Angeles, CA, with whom were Ronald J. Schutz, Christopher K. Larus, Bryan J. Mechell, Jessica Gutierrez, Zac Cohen, Stephanie A. Quartararo, Minneapolis, MN, for plaintiff, 4DD Holdings, LLC, and T4 Data Group, LLC.

John J. Todor, Senior Trial Counsel, United States Department of Justice, Civil Division, with whom were Brian M. Boynton, Principal Deputy Assistant Attorney General, Patricia M. McCarthy, Director, and Elizabeth

¹ This opinion was originally issued under seal to afford the parties an opportunity to propose redactions of protected information. Defendant proposed one redaction, which we have adopted. Plaintiffs did not propose any redactions. The redaction is indicated with the insertion of asterisks in place of the original material.

M. Hosford, Assistant Director, for defendant. *Scott Bolden*, Deputy Director, *Rachel Hicks*, *Andrew Hunter*, and *Stephen Smith*, of counsel.

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OPINION

This action arises out of a software developer’s claim for copyright infringement. It involves government officials who infringed a copyrighted computer software and then tried to hide the infringement by destroying evidence and misrepresenting their actions. The copyright owner, 4DD Holdings, LLC,² now sues the United States for infringement, seeking compensation for the tens of thousands of infringing copies made by the government.

We held a two-week trial in November 2022 with closing arguments held in June 2023. For the reasons provided below, we hold that the government infringed 4DD’s copyright and, as a result, 4DD is entitled to its “reasonable and entire compensation.” 28 U.S.C. § 1498(b) (2018).

BACKGROUND

I. The Need for Data Sharing Within the Department of Defense

Accurate medical records are vital for doctors to provide effective healthcare. But for many decades, both the Department of Defense (DOD) and the Department of Veterans Affairs (VA) have struggled to maintain and supply comprehensive healthcare records for our nation’s military members. They have struggled because they each store millions of healthcare records across hundreds of poorly connected databases. This often prevents doctors and nurses from obtaining a patient’s complete medical record and impedes their ability to provide care.

To cure this data sharing problem, DOD created the Defense Health Management System Modernization (DHMSM) program. Def.’s Ex. (DX) 665A at 1–2. This “massive” and “complete refresh” of DOD’s entire healthcare IT infrastructure was intended to eliminate DOD’s data sharing problem because this new system would be able to create a single health

² Although there are two named plaintiffs, we refer to them as one. T4 Data Group is a subsidiary of 4DD Holdings.

record for every patient. Tr. 1505 (Christopher Miller).³ An overhaul of this kind, however, would take many years to implement, and Congress did not share DOD’s patience. Rather than wait, Congress gave DOD an ultimatum: solve the data sharing problem sooner or lose the funding for the project.

DOD understood that it could not pursue DHMSM without Congressional support. At the same time, it also did not want to abandon one of its top programs. *See* Tr. 1515 (Miller) (testifying that DHMSM was “easily in the top two or three programs for the Secretary of Defense”). To appease Congress, the Department also initiated the Defense Medical Information Exchange (DMIX) program, which would meet Congress’s interoperability mandate by “improving [DOD’s] near-term data sharing” problem. Tr. 1499 (Miller). Then, after Congress released the funding, DOD could return its focus to DHMSM—the program that was always its “long-term strategy.” *Id.*; *accord* DX 665A at 1–2.

As the short-term interoperability solution, DMIX’s purpose was to federate existing data. With information stored in hundreds of databases, DOD wanted a program that could harmonize information from disparate data sources and produce it in a single format. In essence, the program would display information as if it were coming from a single database even though it came from many.

DOD chose Systems Made Simple (SMS) as the lead contractor for the DMIX effort and tasked it with identifying and implementing a data federation solution. After considering many options—including an evaluation of competing products and their prices—SMS eventually selected Tetra Healthcare Federator, a commercial software developed by 4DD Holdings.

Tetra Healthcare Federator consists of several parts. The product’s “main processing engine” is Tetra Services. Tr. 369 (Monty Myers). Tetra Services has no visual interface but is a “programming application interface” that allows computers to interact. Tr. 780 (Bennett McPhatter). Next, the record keeper is Tetra Audit. With Tetra Audit, the software maintains a history of every operation that the program runs. Tetra’s final component is Tetra Snap Cache, a component that temporarily stores information, which allows it to be retrieved more quickly. Along with these components, Tetra Healthcare Federator also requires a separate program called Tetra Studio.

³ Transcript references indicate the witness being cited.

Tetra Studio is a graphical interface and programming tool that allows software engineers to “enable and instruct Tetra [Healthcare Federator] how to function.” Tr. 741 (Myers).

II. 4DD Licenses Tetra to the Government

4DD licensed Tetra in the following way. For Tetra Healthcare Federator, which includes its several components, the software is licensed per computer core.⁴ Computer cores represent a computer’s processing power, and each Tetra license correlates with one core. For example, if a customer had a four-core computer, it would have to buy four Tetra Healthcare licenses—one for each core. Tetra Studio, on the other hand, is licensed per “seat” or per user. *See* Tr. 522 (Myers) (“A seat is synonymous with a name. It’s a named user accessing that machine.”).

Because 4DD had never sold its Tetra Healthcare product before, it had no established pricing. Nevertheless, its software was listed on Immix Technology’s SEWP (Solutions for Enterprise-Wide Procurement) contract, and that contract adopted the following pricing scheme: One computer core of Tetra Healthcare Federator was listed at \$24,000, and the software could be purchased in blocks of cores ranging from 8 to 512. To encourage larger purchases, 4DD offered a volume discount, meaning that as the number of purchased cores increased, the price per computer core decreased. Similarly, 4DD also sold Tetra Studio in blocks of seats ranging from 25 to 500. A single seat cost \$6,000, but like the federator product, customers received a volume discount for larger purchases.

After SMS selected Tetra as the interoperability solution, the government licensed 64 cores of Tetra Healthcare Federator and 50 seats of Tetra Studio for roughly \$1 million—the amount of other-direct-cost dollars remaining on SMS’s contract.⁵ This reduced price averaged to about \$10,000

⁴ In its licensing structure, 4DD did not distinguish between physical cores and virtual cores, and, as we explain below, there is no practical difference between them.

⁵ The trial testimony indicated that these were the cores and seats necessary “to get started [on the project] right away, to show some progress on the project while [the government] end[ed] out the fiscal year and then [to] grow

per core and \$3,000 per seat. The agreement also included several option years that let the government buy additional cores and seats at the same price.

In addition, the government also agreed to 4DD's End-User Licensing Agreement (EULA). Among many other things, 4DD's EULA prohibits users from copying Tetra. It included one exception, however, which allowed for a single backup copy in case "the original copy is damaged or destroyed." Pl.'s Trial Ex. (PTX) 5 at 5.

Within the government, only two employees seemed to know of the EULA's existence: (1) Dave Calvin, the chief engineer and contracting officer's representative for the DMIX contract; and (2) Sheila Swenson, the contracting officer's representative for the Tetra licensing agreement. Even their knowledge of the EULA's terms appears to have been limited, however. For example, Mr. Calvin did not know that the EULA prohibited copying because he "kind of . . . scann[ed] through that part" when he read the agreement. Tr. 1826 (Calvin). Neither Mr. Calvin nor Ms. Swenson told SMS that its use of Tetra was limited by 4DD's EULA.

Licensing agreements often require a method for monitoring license usage, and software companies like 4DD normally design their software to alert them when a copy of their software is activated.⁶ That feature could not be used here, however, because it presented security risks to government networks. As a result, the responsibility to track license usage fell on the government, and 4DD had to "rely on [its] honesty." Joint Trial Ex. (JTX) 147 at 1.

Without any private enforcement tools, the license tracking responsibility fell to Ms. Swenson. Based on prior experience, Ms. Swenson was concerned with the government's ability to monitor its use of the license. She explained that the government "easily gets out of whack by standing up multiple [computers] for X purpose, never taking them down, and repurposing them." Then, "suddenly we need another 104 licenses." JTX 53 at 2 (cleaned up). For that reason, she asked 4DD to create a license tracking portal, hoping that it would "make the monitoring process as painless as

immediately after." Tr. 164 (Patrick Truxillo). Beyond that, however, the parties appeared to have conflicting expectations about how many cores and seats would be necessary for the entire project.

⁶ This feature cannot detect inactive software copies, such as backups.

possible.” *Id.*

The license tracking portal created by 4DD had limited enforcement value. Although it recorded Tetra installations and many other details, it suffered from serious weaknesses. First, the portal required the government to voluntarily supply information, and so dishonesty or negligence would nullify its effectiveness. Second, the portal only tracked Tetra downloads directly from 4DD; it did not contemplate other Tetra copies created by the government after the government downloaded and installed the software. Perhaps the portal’s biggest flaw, however, was that Ms. Swenson never looked at it. Instead, her license tracking method essentially boiled down to one question for Mr. Calvin: “Do you need more [licenses]?” Tr. 1345 (Swenson). She never asked Mr. Calvin how many licenses were installed because she “just stupidly assumed he was under [the limit].” Tr. 1350 (Swenson).

III. The Software Development Lifecycle

After Tetra was selected, SMS began the software development lifecycle—the process that “includes testing, developing, and [eventually] releasing the software.” Tr. 2109 (Ronald Schnell). Although Tetra is a commercial product, it was not immune from the development process because it required “code packages” or written instructions that told it “[w]hat to pull, what to push, [and] where to find things.” Tr. 2126–27 (Schnell); *accord* Tr. 423 (Myers). Essentially, these code packages are wrapped around Tetra’s object code, allowing the two to interact.

SMS used an “agile” software development process called “continuous integration and continuous application delivery.” Tr. 407 (Myers). With continuous integration or agile development, software can be developed more quickly. Programmers no longer “wait on large releases” of software code but target “specific smaller goals.” Tr. 2111 (Schnell). In doing so, code packages are tested sooner, which enables faster problem detection and correction. The process is also made quicker with applications that allow a central computer to automatically combine the work of several programmers, each of whom are working on their own piece of the software. *See* Tr. 447–48 (Myers) (explaining how programs like “Jenkins” automatically compile work).

Another critical aspect of agile development is the use of virtual machines. A virtual machine is a computer that “run[s] on top of” and resides in a physical computer. Tr. 2099 (Schnell); *accord* Tr. 424 (Myers).

Although the virtual machine exists within a physical computer, it is a distinct computer from the physical one it is running on.⁷ *See* Tr. 424 (Myers). From the user’s perspective, though, a virtual computer operates no differently from a physical one. *See* Tr. 2101 (“You can log into it, you can have it do tasks, [and] you can run programs on it just like it was a physical machine.” (cleaned up)) (Schnell).

Virtual machines complement the agile development process because they are flexible and cheap. First, they reduce the number of physical computers needed because they can run remotely from one or several centrally located physical computers. Second, a physical computer is also static and constrained by its hardware specifications. A physical computer built with four processing cores will always have four processing cores. Virtual machines, on the other hand, are dynamic and can be created and managed however the user wants. *See* Tr. 426 (Myers). A virtual machine can begin with four computer cores but then be reconfigured within seconds to use more cores or less. This ability makes them ideal for agile software development.

The DMIX software development lifecycle started at SMS’s laboratory. There, development proceeded in “sprints” or short bursts of programming and testing that lasted three weeks. Sprints began with software engineers writing code packages. Then, after the packages were written and compiled, engineers conducted three tests: (1) functional tests, which evaluated whether the code packages did what they were programmed to do; (2) performance tests, which evaluated whether the code packages functioned at full scale; and (3) integration tests, which evaluated whether the code packages communicated with the appropriate medical databases.

After a code package passed every test, it was released and transferred to a separate facility, the government’s Development and Test Center (DTC).⁸ Within the DTC, the government maintained two networks—“.com” and “.mil”—that each had different security levels. The .com network had “practically no security,” which allowed code packages to be transferred into the DTC with little risk to the government’s networks. Tr. 1830 (Calvin).

⁷ Because these virtual machines were distinct computers, software developers needed a Tetra Studio seat license for each of them.

⁸ Although the DTC was a government facility, SMS remotely conducted the testing that occurred there.

Once the code packages were inside the .com network, they could then be secured or “stigged.” Tr. 1831 That process often caused code packages to malfunction, however, so engineers had to continue to test and fix the packages. When a code package was fully secured and functional, it could then move to the secure .mil network. A code package completed the software development lifecycle once it could function inside the .mil network.

IV. The Government Violates the EULA

SMS’s software development lifecycle ignored the EULA’s prohibition against copying. As a result, SMS, working on DOD’s behalf, created thousands of Tetra copies. Specifically, it regularly created backup copies that included Tetra, it cloned virtual machines that included Tetra, and it made new copies of Tetra any time that it released a code package to the DTC.

Using the license tracking portal—which, again, only contained the government’s self-reported instances—4DD eventually determined that the government exceeded its license by at least 68 computer cores. It did not immediately alert the government, however, because it claimed that it wanted to support the project. *See* Tr. 200–01 (Patrick Truxillo). Several months later, as the end of the fiscal year approached, 4DD sent Ms. Swenson an invoice for what it believed were the excess cores. At the same time, 4DD also expressed its willingness to discuss an alternative licensing framework and to offer “unprecedented discounts for the enterprise use of Tetra.” JTX 119 at 1.

Up until this point, Ms. Swenson was unaware that the government had exceeded its license. After 4DD notified her of the problem, she contacted Gina Walker, the contracting officer for the Tetra licensing agreement. Ms. Walker directed Ms. Swenson to initiate a “true-up” negotiation that would locate and pay for all the Tetra copies.

During the true-up negotiations, Ms. Swenson never allowed 4DD and SMS to communicate directly because she “didn’t want a food fight between contractors.” Tr. 1353 (Swenson). Instead, she independently worked with each “to make sure that [the government] had data from every place that [Tetra] could be loaded”—the SMS laboratory and the DTC. Tr. 1352 (Swenson). That process mainly entailed a convoluted exchange of spreadsheets in which the parties quarreled about how many Tetra copies existed.

Unfortunately, the government’s left hand did not know what its right hand was doing. While Ms. Swenson worked to find Tetra copies, Mr. Calvin—without telling anyone—simultaneously ordered that the copies in the DTC be deleted. Although he testified that he did not order the deletions to avoid liability, his instructions at the time explained that there was “a license issue that [he] must clear up.” JTX 124 at 2 (DTC Change Request). Either way, these deleted copies were never acknowledged during the true-up.

Next, after several months of exchanging spreadsheets, Mr. Calvin and Ms. Swenson “verified” that the government had installed Tetra on 64 computer cores in the DTC. JTX 130 at 1. That was not true, however, as Mr. Calvin had never looked for Tetra copies in the DTC. Tr. 1860–63 (Calvin). Instead, Ms. Swenson invented that number as a “placeholder” and conceded at trial that it was not “based on . . . any data from the DTC or SMS.” Tr. 1455–56. (Swenson). Neither of them shared this knowledge with 4DD during the true up.

Several weeks later, the government and 4DD scheduled a final true-up meeting. Shortly before the meeting, Ms. Swenson and Mr. Calvin met to discuss a strategy. Mr. Calvin wanted Ms. Swenson to minimize the core number because he believed that the government was “getting screwed by 4DD’s unique licensing structure.” JTX 139 at 1. To that end, he suggested that she begin the negotiation with a core count of 168 and set a “ceiling” of 232. Ms. Swenson disagreed that the government was “getting screwed” but ultimately adopted Mr. Calvin’s strategy.

Once the final meeting began, it “quickly became . . . very contentious.” Tr. 1383 (Swenson). Arguments ensued about how many Tetra copies existed with little resolution achieved. Eventually, Ms. Swenson was “fed up” with the negotiations and screamed, “Stop!” Tr. 1384, 1425 (Swenson). She then asked, “Is [168 cores] the number? Is everybody good with this number?” Tr. 1384 (Swenson). She claims that “everybody was good with the number,” *id.*, but she never told 4DD that she was “suspicious” of it because she “had no data from the DTC” and had not “evaluated all the data that was possible,” Tr. 1448 (Swenson) (cleaned up).

After the parties agreed that the government exceeded the license by 168 cores, they needed to negotiate a price. To that end, 4DD met with Ms. Walker and demanded that the government buy the 168 excess cores at the SEWP price of \$24,000 per core. Ms. Walker rejected that number, telling 4DD’s representatives that if they wanted that price, they could “fight it out

in court.” Tr. 894 (McPhatter). She admitted that the government “made a mistake” with its copying, but she believed that it was only “fair that [it] pay the same price” of roughly \$10,000 per core. Tr. 2025 (Walker). 4DD relented, and the parties settled at the original contract price for a total of \$1.7 million. As part of the settlement, 4DD released the government from any further liability.⁹

V. DOD Abandons Tetra

In 2014, shortly after Christopher Miller took charge of DOD’s program office for military health systems, he ended DOD’s work with Tetra, which essentially rendered the government’s Tetra license worthless. In his view, SMS’s work with Tetra was not “getting there in terms of the functionality and performance.” Tr. 1543 (Miller). Instead, he believed that DOD could comply with Congress’s interoperability mandate by simply improving its existing systems. Around that same time, DOD formally launched the DHMSM project, which it eventually awarded to a company called Leidos for a total value of \$4.3 billion. The government did not tell 4DD about this decision, however, until several months later.

VI. Procedural History

In August 2015, 4DD filed this suit for copyright infringement against the United States. Shortly after, the government moved to dismiss part of 4DD’s claim for lack of subject matter jurisdiction. It argued that we lacked jurisdiction under 28 U.S.C. § 1498(b) because the United States did not authorize or consent to some of SMS’s copying. We disagreed, holding that the government’s “instructions, concessions, and acceptance of responsibility demonstrate that [it] authorized or consented to SMS’s allegedly infringing use of the Tetra software.”¹⁰ *4DD Holdings, LLC v.*

⁹ The release stated that “[i]n consideration of the modification agreed to herein, the contractor hereby releases the Government from any and all liability under this contract for further equitable adjustments attributable to such facts and circumstances giving rise to this particular modification.” PTX 9 at 1.

¹⁰ In addition, Mr. Calvin testified at trial that he “oversaw . . . anything to do with software engineering and development” for the DMIX project. Tr. 1741 (Calvin).

United States, 143 Fed. Cl. 118, 130 (2019).

With the jurisdictional question resolved, the parties proceeded with discovery.¹¹ Through discovery, 4DD learned that relevant evidence had been destroyed, prompting it to move for sanctions. We found that three categories of evidence had been destroyed, all of which “would have aided in determining the extent of the government’s use of 4DD’s software”: (1) the Tetra copies in the DTC; (2) the laptops issued by the government to SMS employees; and (3) the DTC servers. *Id.* at 134.

For the first two categories, we held that the government intentionally destroyed the evidence to deprive 4DD from using it in litigation. First, in the DTC, we concluded that Mr. Calvin intentionally destroyed Tetra copies because he explained then that those copies needed to be deleted because of “a license issue.” *Id.* at 133. Second, when it came to the SMS laptops, we concluded that the government lacked “any credible explanation for [why] the deletion” occurred several months after the complaint was filed and a preservation hold had been issued. *Id.* As a result, we presumed that information about these categories would be unfavorable to the government and left the application of that presumption for trial.¹² For the third category, however, we concluded that there was “not a pattern of willful behavior.” *Id.* Instead, the destruction resulted from negligence and “a failure to communicate.” *Id.* We declined to apply any adverse inference to the destruction of the DTC servers.

After discovery, both parties moved for summary judgment. 4DD’s motion advanced four arguments: (1) that it had a valid copyright for Tetra; (2) that 4DD’s EULA prohibited copying of Tetra’s object code as a condition precedent; (3) that any copying that exceeded the EULA’s limit would constitute copyright infringement; and (4) that the government created thousands of infringing copies. We granted 4DD’s motion with respect to the first three issues. To the fourth, however, the issue was left for trial because it was unclear how many Tetra copies the government had created. *See 4DD*

¹¹ The parties completed factual discovery before we resolved the motion to dismiss. They then proceeded with expert discovery.

¹² In addition, we shifted roughly \$1.1 million of 4DD’s fees that were related to the government’s destruction of evidence. *See 4DD Holdings, LLC v. United States*, 153 Fed. Cl. 371 (2021).

Holdings, LLC v. United States, 159 Fed. Cl. 337, 343–51 (2022).

The government cross-moved for summary judgment on two grounds, both of which we rejected. First, the government argued that 4DD’s copyright claim was barred by the release of liability that it signed as part of the true-up. We agreed that the release, if valid, would bar 4DD’s claim but held that factual questions about its validity still existed. Second, the government argued that it could make most of the Tetra copies as an owner of the software under the Copyright Act.¹³ We disagreed and held that the government was not an owner but merely a licensee. *See id.* at 351–56.

DISCUSSION

I. The Government’s Affirmative Defenses

A. Release of Liability

Before moving to whether the government infringed 4DD’s copyright, a threshold issue exists. As explained above, after 4DD realized that the government made unauthorized Tetra copies, the parties engaged in a true-up negotiation. As a result, and in exchange for buying the over-installed copies, 4DD released the government from any other liability. If that release is valid, 4DD’s copyright claim is barred.¹⁴

A release is “a contract whereby a party abandons a claim or relinquishes a right that could be asserted against another.” *Holland v. United States*, 621 F.3d 1366, 1377 (Fed. Cir. 2010). “If a party’s manifestation of assent” to a release “is induced by either a fraudulent or a material

¹³ In limited circumstances, the Copyright Act allows “the owner of a copy of a computer program to make or authorize the making of another copy or adaptation of that computer program.” 17 U.S.C. § 117(a).

¹⁴ The parties appear to use the terms “release” and “accord and satisfaction” interchangeably, but they are “separate contractual defenses.” *Holland v. United States*, 621 F.3d 1366, 1377 (Fed. Cir. 2010). While an agreement could “constitute both a release and an accord and satisfaction,” *id.*, we use only the terminology relating to “release” for simplicity. In the end, whether the true-up agreement is characterized as a “release” or an “accord and satisfaction” makes no difference; both are invalid if there is misrepresentation. *See, e.g., Kenbridge Constr. Co. v. United States*, 28 Fed. Cl. 762, 765 (1993).

misrepresentation . . . the contract is voidable by the recipient.” *C & H Com. Contractors, Inc. v. United States*, 35 Fed. Cl. 246, 256 (1996). Misrepresentation, as a contractual defense, contains four elements: (1) a party misrepresented a fact; (2) the misrepresentation was fraudulent or material; (3) the other party relied on the misrepresentation; and (4) the other party was justified in relying on the misrepresentation. *Id.*

The government argues that the release is valid for three reasons. First, the government argues that it never misrepresented any facts. Second, it claims that even if it did misrepresent facts, none of them were material. And third, it maintains that 4DD could not reasonably rely on any material misrepresentations. We disagree, and for the reasons below, hold that the government fraudulently and materially misrepresented the extent of its copying, which invalidates the release.

1. Misrepresentation of Fact

First, a party engages in misrepresentation if it makes “an assertion that is not in accord with the facts.” *Barrer v. Women’s Nat’l Bank*, 761 F.2d 752, 758 (D.C. Cir. 1985). Unlike fraud, however, misrepresentation “does not require an intent to deceive.” *First Interstate Bank of Billings v. United States*, 61 F.3d 876, 880 (Fed. Cir. 1995). Instead, “ignorance or carelessness” can suffice. *CanPro Invs. Ltd. v. United States*, 130 Fed. Cl. 320, 343 (2017). At the same time, concealment—which is “an affirmative act intended or known to be likely to keep another from learning of a fact of which he would otherwise have learned”—is “always equivalent to a misrepresentation and has [the same] effect.” *Id.* In either case, though, the misrepresentation must relate to facts existing “at the time the assertion is made” and not “to future events.” *Fed. Grp., Inc. v. United States*, 67 Fed. Cl. 87, 102 (2005).

The evidence shows that the government misrepresented facts throughout the true-up negotiation. First, Mr. Calvin deleted Tetra copies in the DTC to prevent 4DD from learning about them. *4DD Holdings*, 143 Fed. Cl. at 134. In doing so, he should have known that his actions were “likely to keep [4DD] from learning of a fact” that it “would otherwise have learned.” *CanPro*, 130 Fed. Cl. at 343. And because he did not tell 4DD about these deleted copies, the government’s representation about the number of prohibited copies was “not in accord with the facts.” *Barrer*, 761 F.2d at 758.

Second, Mr. Calvin and Ms. Swenson falsely represented that they had “verified” the number of Tetra installations in the DTC. This was not

true because Ms. Swenson had instead created that number as a “placeholder” and later admitted that it was not “based on . . . any data from the DTC.” Tr. 1455–56 (Swenson). In addition, Mr. Calvin testified that he never looked for Tetra copies in the DTC. Tr. 1860–63 (Calvin).

Finally, Ms. Swenson never told 4DD that she had not “evaluated all the data that was possible.” Tr. 1448 (Swenson) (cleaned up). Nor did she tell 4DD about her suspicion of the final number. Thus, through her silence, she carelessly misrepresented the government’s efforts and the final number’s accuracy.

2. Materiality of the Misrepresentation

Second, a misrepresentation must either be fraudulent or material. Restatement (Second) of Contracts § 164. First, a misrepresentation is fraudulent if the maker (1) “knows or believes that the assertion is not in accord with the facts,” (2) “does not have the confidence that he states or implies in the truth of the assertion,” or (3) “knows that he does not have the basis that he states or implies for the assertion.” *Id.* § 162. Second, a misrepresentation is material if “it would be likely to induce a reasonable person to manifest his assent,” or “if the maker knows that it would be likely to induce the recipient to do so.” *AT&T Commc’n, Inc. v. Perry*, 296 F.3d 1307, 1312 (Fed. Cir. 2002).

Here, the government fraudulently misrepresented the number of Tetra copies that it had made. Because Mr. Calvin deleted Tetra copies, he knew that the government’s representations about the number of copies were untrue. Similarly, Mr. Calvin and Ms. Swenson both knew that the government never “verified” the number of cores in the DTC. Thus, in each case, the government “kn[ew] . . . that [its] assertion[s] [were] not in accord with the facts.” Restatement (Second) of Contracts § 162.

In addition, the government’s misrepresentations were also material. The purpose of the true-up negotiation was to “identify every [Tetra] instance.” Tr. 1351 (Swenson). Thus, an accurate copy count is a basic fact that lies at the heart of the true-up agreement. The government should have known that its misrepresentations—which severely downplayed the extent of the government’s license violation—“would be likely to induce” 4DD to agree to the release. *AT&T Commc’ns*, 296 F.3d at 1312.

3. Reliance on the Misrepresentation

Third, a misrepresentation must also be “causally related to the

recipient's decision to agree to the contract." *Barrer*, 761 F.2d at 759. Reliance on the misrepresented fact "need not, however, be the sole or predominant factor influencing the recipient's decision." *Id.* Because the government presented no evidence to the contrary, we conclude that its misrepresentations were "causally related" to 4DD's "decision to agree to the" release. *Id.*

4. Justifiable (or Reasonable) Reliance

Finally, "[o]ne of the central elements of the doctrine of misrepresentation is that the injured party's reliance upon the statement must have been innocent or reasonable." *Gregory Lumber Co. v. United States*, 11 Cl. Ct. 489, 503 (1986). Here, 4DD reasonably relied on the government's misrepresentations. The government requires software providers to disable most features that allow for license enforcement, and in doing so, the government understands that those software providers must trust the government. *See* JTX 147 at 1 ("[T]he [software] vendors rely on the honesty of the government.") (email from Mr. Calvin to Ms. Walker). In circumstances such as these, where the government forces software providers to remain in the dark, it cannot later claim that those software providers have unreasonably relied on government misrepresentations.

The government offers two main reasons for why 4DD could not rely on the government's misrepresentations, neither of which we find persuasive. First, the government argues that 4DD knew the investigation in the DTC was unfinished when it agreed to the release. While we find that implausible based on the government's other representations, it makes no difference because there was not an ongoing investigation in the DTC. Tr. 1860–63 (Calvin). Second, the government reminds us of a contractual clause that allowed 4DD to *request* to examine DTC computers, but that is also irrelevant. In the unlikely event that the government allowed 4DD to search the DTC, that search would have been futile because the government had already deleted the Tetra copies in the DTC.

We also note that the government made little effort in its factual presentation at trial to establish 4DD's knowledge of the government's copying. Although some 4DD employees were part of SMS's team, the government offered us no real basis for understanding the role those employees played. Indeed, the only 4DD employee that the government called as a witness, Mr. Duane Epperly, remembered almost nothing about his time working with SMS.

We therefore hold that the release does not bar 4DD's claim. The government fraudulently and materially misrepresented the extent of its copyright infringement, and it cannot now invoke that agreement to bar 4DD's copyright claim.

B. Equitable Estoppel

Even without the release, 4DD's copyright claim is still estopped, the government argues, because 4DD delayed suit after it knew about the government's over-installations.¹⁵ Equitable estoppel, as its name suggests, is an equitable defense that applies "when a copyright owner engages in intentionally misleading representations concerning his abstention from suit, and the alleged infringer detrimentally relies on the copyright owner's deception." *Petrella v. Metro-Goldwyn-Mayer, Inc.*, 572 U.S. 663, 684 (2014).

Equitable defenses, however, require "clean hands." *Precision Instrument Mfg. Co. v. Auto. Maint. Mach. Co.*, 324 U.S. 806, 814 (1945). While "[c]lean hands" does not mean that those who "assert[] equitable defenses" must have lived "blameless lives," it does require that they "act[] fairly and without fraud or deceit as to the controversy in issue." *Melrose Assocs., L.P. v. United States*, 43 Fed. Cl. 124, 150 (1999). That makes sense given that courts should not be "the abett[ors] of iniquity." *Precision*, 324 U.S. at 814. To that end, then, courts have a "wide range . . . of discretion in refusing to aid the unclean litigant." *Id.* at 815.

The government comes before the court with unclean hands. It has intentionally destroyed evidence and lied to 4DD about its actions. Thus, it has not "acted fairly and without fraud or deceit," and so we will not apply the doctrine to bar 4DD's claim. *Melrose*, 43 Fed. Cl. at 150.

Even setting that aside, equitable estoppel would still not apply. Equitable estoppel includes three elements: (1) "misleading conduct, which may include not only statements and actions but silence and inaction, [that]

¹⁵ The government's briefing is unclear as to what behavior by 4DD gives rise to this defense. If the justification is solely delay, the appropriate defense is laches. "The test for estoppel is more exacting than the test for laches, and the two defenses are differently oriented." *Petrella*, 572 U.S. at 684. When it comes to estoppel, "[d]elay may be involved, but [it] is not an element of the defense." *Id.* at 684–85.

lead[s] another to reasonably infer that rights will not be asserted against it”; (2) “reliance upon th[e] [misleading] conduct”; and (3) “material prejudice” because of the party’s reliance. *Mabus v. Gen. Dynamics C4 Sys., Inc.*, 633 F.3d 1356, 1359 (Fed. Cir. 2011).

The government claims that it was misled because 4DD never objected to the government’s over-installations. To begin with, we find that the government failed to prove that 4DD fully understood or should have fully understood the extent of the government’s infringement. But regardless, the government cannot rely on 4DD’s failure to object as evidence of misleading conduct because 4DD’s EULA contained a non-waiver clause. *See Long Island Sav. Bank, FSB v. United States*, 503 F.3d 1234, 1252–53 (Fed. Cir. 2007) (stating that “a failure to object does not amount to evidence of waiver” when an agreement contains a non-waiver clause).

In any event, the government did not offer any proof that it relied on conduct from 4DD. Indeed, the government presented no evidence that a government official believed his or her actions were unlawful yet continued copying because of misleading conduct by 4DD. If anything, the opposite is true as government employee witnesses testified that they did not believe their actions violated 4DD’s EULA (with some who appear to still hold that belief). To argue that government employees were somehow duped is disingenuous at best. Thus, we hold that 4DD is not estopped from bringing its copyright infringement claim.

II. Copyright Infringement

A. Copyright Act

Under the Copyright Act, “the owner of [a] copyright” has “the exclusive right[]” to “reproduce the copyrighted work in copies.” 17 U.S.C. § 106(1). A “copy,” the Act tells us, is a “material object[] . . . in which a work is fixed by any method . . . and from which the work can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device.” § 101. And within that definition, a material object is “fixed,” when it is “sufficiently permanent or stable to permit it to be perceived, reproduced, or otherwise communicated for a period of more than transitory duration.” *Id.*

While the Act gives the copyright owner the right “to publish, copy, and distribute the author’s work,” *Harper & Row Publishers, Inc. v. Nation Enters.*, 471 U.S. 539, 547 (1985), “[n]ot all copying . . . is copyright

infringement,” *Feist Publ’ns, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340, 361 (1991). A “copy” is only infringing if it contains “constituent elements of the work that are original.” *Id.* In other words, the portions copied by the alleged infringer must contain protected elements of the copyrighted work. In the computer software context, that refers to portions of a software’s coding that are original to the author. *See Atari Games Corp. v. Nintendo of Am., Inc.*, 975 F.2d 832, 840 (Fed. Cir. 1992).

Often, determining which portions of a copyrighted work contain protectable expression under the Copyright Act is difficult. *See, e.g., Tanksley v. Daniels*, 902 F.3d 165, 174–75 (3d Cir. 2018). And that is especially true when the copyrighted work is computer software. *See, e.g., SAS Inst., Inc. v. World Programming Ltd.*, 64 F.4th 1319, 1326–27 (Fed. Cir. 2023) (explaining the “abstraction-filtration-comparison method”). Fortunately, we need not undertake that challenging task here because every Tetra copy created by the government contained Tetra’s complete object code, and “verbatim copying is infringement.” *Atari Games*, 975 F.2d at 840.

When it comes to a license agreement, however, the issue is more nuanced. That is because these agreements often contemplate some form of permissible copying, and so the scope of the license agreement defines what constitutes unlawful reproduction under the Copyright Act. Infringement in this context, then, requires that “the copying [is] beyond the scope of a license possessed by the” licensee. *Storage Tech. Corp. v. Custom Hardware Eng’g & Consulting, Inc.*, 421 F.3d 1307, 1315–16 (Fed. Cir. 2005); *accord MDY Indus., LLC v. Blizzard Ent., Inc.*, 629 F.3d 928, 940 (9th Cir. 2010) (stating that “copyright infringement based on breach of a license agreement” requires “copying [that] exceed[s] the scope of the defendant’s license”).

From these cases, we can distill the following rule. Copies of computer software subject to a license agreement infringe a copyright if two things are true: (1) the copies include original software code, and (2) the copying exceeds the scope of the license agreement.

B. Tetra Copies

To answer the liability question, we must determine how many Tetra copies the government created in excess of the license. Because the government destroyed much of the direct evidence, 4DD’s computer science expert, Mr. Monty Myers, attempted to forensically recreate the DMIX

project.¹⁶ As a result, all the copies he identifies are inferred from about 2 million documents related to the government's plans, communications, and procedures.

Using these documents, Mr. Myers searched for any evidence of complete copies of Tetra's object code. Object code is also known as "machine code" and is the code that runs on the computer. Tr. 368–69 (Myers). If Mr. Myers found evidence that an SMS or DTC environment contained the complete object code of at least one of the Tetra components (e.g., Tetra Services), he counted it as a copy. For Tetra Studio, however, which is licensed per seat, Mr. Myers used a different approach and only counted Tetra Studio instances that were installed on a machine with at least one other Tetra Healthcare Federator component.

Next, as Mr. Myers identified Tetra copies, he categorized them into seven groups: (1) deployed virtual machine copies, (2) deployed update copies, (3) distribution open virtual access (OVA) copies, (4) deployed OVA copies, (5) full reserve virtual machine copies, (6) full backup operating system copies, and (7) Random Access Memory (RAM) copies. These categories have no legal or technical significance, but we adopt them as a convenient way to conceptualize the copies created by the government.

First, a deployed virtual machine copy is the most basic form of Tetra copy and reflects a Tetra copy that SMS installed on an active virtual machine. Second, the deployed update category includes all the copies that SMS made during the continuous integration software development process. In other words, these were the Tetra copies embedded in SMS's code packages that moved through the software development lifecycle. Third, the distribution OVA category refers to copies that were made when the government transferred code packages from the SMS lab to the DTC. Because an "air gap" existed between these two locations, the government used physical transfer mediums like Universal Service Buses to release the code packages to the DTC.

Fourth, the deployed OVA category covers backup copies produced

¹⁶ Mr. Myers testified that the following destroyed evidence would have enabled this court to determine the exact number of Tetra copies created by the government: (1) the source code control history; (2) the automated build systems; (3) the computers containing Tetra; and (4) historical records about image repositories, media transfer systems, and backup copies.

in the DTC’s “library repository.” Tr. 545 (Myers). The library repository was “the master brain of the DTC” and retained “a copy of every” virtual machine. *Id.* Fifth, the full reserve virtual machine category included all the virtual machine backups created by SMS. Sixth, the last backup category encompasses the full backup operating systems copies, which were copies that contained a backup of “everything on [a particular] system.” Tr. 555 (Myers). Essentially, these copies were a failsafe or “a backup approach to the backup.” Tr. 560 (Myers).

The last category consists of RAM copies. These were distinct Tetra copies created by a virtual machine anytime Tetra was activated. When a program is activated, a computer creates a second copy of the program and loads it into the RAM. These copies are only temporary, however, because the RAM is emptied whenever the computer shuts down.

After categorizing Tetra copies into these groups, Mr. Myers attempted to associate these copies with computer cores and seats—a task relevant to both infringement and damages. While the EULA prohibited all copying of Tetra’s object code (except for one backup copy), a copy’s value is relative to the number of cores or seats associated with it. To illustrate, one copy associated with four computer cores would require the customer to buy four Tetra licenses. Yet if that same copy was instead associated with 64 computer cores, the customer would now need to buy 64 Tetra licenses. Thus, the copy’s value increases or decreases with the number of associated cores or seats. At the same time, the number of associated cores and seats also tells us by how many cores and seats the government exceeded the license.

Mr. Myers had several methods for associating computer cores with Tetra copies. First, many virtual machines had documented Internet Protocol addresses, which allowed Mr. Myers to learn how many computer cores belonged to those machines. Second, some SMS documents recorded the core counts for other virtual machines. And third, for Tetra copies like backups, the virtual machine’s core count was also saved along with the Tetra code. For Tetra Studio, however, Mr. Myers associated seats with each person “that had access to” a Tetra Studio copy. Tr. 708 (Myers).

Mr. Myers’s analysis led to these results¹⁷:

¹⁷ These results do not include any backup copies (or their associated cores) created after September 2014. Although the government continued to create backup copies until July 2015—and even though 4DD claims in its brief that

Tetra Healthcare Federator		
Category	Copies	Cores
Deployed Virtual Machine	162	1,296
Deployed Update	7,223	29,308
Deployed OVA	162	1,296
Distribution OVA	213	1,584
Full Reserve Virtual Machine	33,306	228,770
Full Backup Operating System	958	6,952
RAM	5,006	21,128
Total:	47,030	290,334

Tetra Studio		
Category	Copies	Seats
Deployed Virtual Machine	162	2,473
Deployed OVA	162	0
Distribution OVA	213	0

it “is entitled to damages for each of the infringing copies made by the Government”—4DD appears to have voluntarily relinquished its claim to damages for backup copies created after September 2014. *See* Pl.’s Post-Trial Br. at 18–19. For example, Mr. Myers testified that he identified 64,386 full reserve virtual machine copies and that he associated them with 477,410 computer cores. Yet 4DD seeks compensation for only 33,000 of those copies and 228,000 of those cores, and it offers no explanation for why it should not be compensated for the other infringing copies. Thus, it appears to have excluded these copies, and we abide by its decision.

Deployed Update	7,222	168,948
Full Reserve Virtual Machine	33,208	0
Full Backup Operating System	958	0
Total:	41,925	171,421

In response, the government offered its own computer science expert, Mr. Ronald Schnell. Unlike Mr. Myers, however, Mr. Schnell did not attempt to independently count Tetra copies. Instead, he only addressed why, from a computer science perspective, certain categories did not infringe.

First, Mr. Schnell disputes the deployed virtual machine category because he claims that these copies were not “runnable” or functional. Tr. 2186 (Schnell). As he defines it, a copy is runnable or functional if it can “run in its present configuration.” Tr. 2282 (Schnell). Second, Mr. Schnell also disputes four other categories—the deployed OVA copies, the distribution OVA copies, the full reserve virtual machine copies, and the full backup operating system copies—because these copies did not “have any [computer] cores that [could] run Tetra.” Tr. 2181 (Schnell). In his view, any copy that could not run or use computer cores cannot count against a software license.¹⁸

We cannot adopt Mr. Schnell’s criticisms. To his point that only runnable software copies should count, there is nothing in copyright law to support that position. Indeed, the government cites no case (and we have found none) in which a court shielded one party’s otherwise infringing

¹⁸ Mr. Schnell also disputes the RAM category, but his reasoning lacked a scientific basis. We cannot count these copies, he says, because doing so would “basically make[] every computer user a software pirate.” Tr. 2147 (Schnell). Whether or not that is true, courts have uniformly held that RAM copies can infringe. *See Storage Tech. Corp.*, 421 F.3d at 1311 (acknowledging that RAM copies can infringe under the Copyright Act); *MAI Sys. Corp. v. Peak Computer, Inc.*, 991 F.2d 511, 519 (9th Cir. 1993) (same). We cannot exclude RAM copies simply because Mr. Schnell believes that doing so would be good policy.

behavior because that party happened to save those infringing copies in a non-runnable state.

In addition, excluding non-runnable copies would contradict the Copyright Act’s text. As always, “[w]hen a statute includes an explicit definition, we must follow that definition,” even if it varies from a term’s ordinary” or even computer science meaning. *Dig. Realty Tr. v. Somers*, 138 S. Ct. 767, 776 (2018). The Copyright Act defines a “copy” as any “material object[] . . . in which a work is fixed by any method . . . and from which the work can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device.” § 101. Non-runnable copies can be “perceived” or “reproduced” in a fixed state, and that is enough to be a “copy” under the Copyright Act.¹⁹

Nor can we exclude Tetra copies that Mr. Schnell claims had no associated cores. Again, when a licensing agreement exists, a copy is infringing if it is “beyond the scope of [the] license.” *Storage Tech. Corp.*, 421 F.3d at 1315–16. Here, the license generally prohibited copying, and it made no exception for copies that lacked any associated cores.

Thus, we hold that each category contains infringing Tetra copies. First, these copies all include protected object code of at least one Tetra component. And second, these copies all exceed the license’s scope. As for the number of infringing copies, we must accept Mr. Myers’s count. The government provided no contrary proof, and each category falls squarely within our spoliation order, so we must presume that any missing evidence is unfavorable to the government. While the adverse inference does not mean that we must rubber stamp Mr. Myers’s opinion, we find nothing unreasonable about it. Although some portions contain some amount of speculation, the government must live with the consequences of its evidence destruction.

III. Damages

With the extent of the government’s copyright infringement

¹⁹ Even if runnability had legal significance, the government destroyed these copies. As we noted in our spoliation order, if runnability was “relevant, [4DD] effectively cannot combat the assertion because the copies no longer exist.” 143 Fed. Cl. at 133. Thus, the adverse inference would attach, and we would presume that the evidence is unfavorable.

established, the only remaining question is the amount of 4DD’s damages. Congress, through 28 U.S.C. § 1498(b), waived sovereign immunity to allow copyright owners to recover from the United States their “reasonable and entire compensation” for copyright infringement. 28 U.S.C. § 1498(b); *Gaylord v. United States*, 777 F.3d 1363, 1367 (Fed. Cir. 2015) (*Gaylord III*). The computation of “reasonable and entire compensation” under Section 1498(b) is essentially identical to “actual damages” under the Copyright Act. *Gaylord v. United States*, 678 F.3d 1339, 1343 (Fed. Cir. 2012) (*Gaylord II*).

A. Established Royalty Rate

In 4DD’s view, the Copyright Act entitles it to anywhere from \$3 to \$5 billion as compensation for the government’s infringement. It arrives at this range by adopting Mr. Myers’s computer core count of 290,334 and pricing them as high as \$17,000 per core (its volume discounted SEWP price). That staggering amount should not concern us, it maintains, because Abraham Lincoln once famously said that “[i]t is as much the duty of government to render prompt justice against itself in favor of citizens, as it is to administer the same between private individuals.” Pl.’s Post-Trial Br. at 96. On that basis, 4DD urges us to treat the government like any private party and require it to pay 4DD’s “established royalty rate” for what it took.

An “established royalty rate” does not spring into existence any time ink hits the page in a licensing agreement, however. *See Unisplay, S.A. v. Am. Elec. Sign Co.*, 69 F.3d 512, 517 (Fed. Cir. 1995). Among other things, it requires “general acquiescence” by a significant “number of persons.” *Sun Studs, Inc. v. ATA Equip. Leasing, Inc.*, 872 F.2d 978, 993 (Fed. Cir. 1989), *overruled on other grounds*, *A.C. Aukerman Co. v. R.L. Chaires Const. Co.*, 960 F.2d 1020 (Fed. Cir. 1992). Here, 4DD has never sold its Tetra Healthcare product to any entity other than the government, and so with only one customer and effectively one sale, it can hardly claim that it has an established royalty rate that entitles it to \$5 billion. Nor do we think President Lincoln would have been sanguine about 4DD’s claim.

B. Non-Infringing Alternative

The government argues that another software called Rhapsody was available as a non-infringing alternative to Tetra and that its existence should cap 4DD’s damages. We are hesitant, however, to incorporate this patent law concept into copyright law. “The two areas of the law, naturally, are not identical twins” *Sony Corp. of Am. v. Universal City Studios, Inc.*, 464 U.S. 417, 439 n.19 (1984). And so, “[w]hile it may often be useful to look to

patent law decisions for guidance in the resolution of questions of copyright law, the inquiry must take into account differences between these aspects of intellectual property.” *Wechsberg v. United States*, 54 Fed. Cl. 158, 162 (2002) (citation omitted).

We decline to apply the non-infringing alternative analysis as a mechanical damages cap for two reasons. First, the relevance of a non-infringing alternative has more force in patent law. Patent law requires novelty and protects only “genuine invention[s] or discover[ies].” *Sears, Roebuck & Co. v. Stiffel Co.*, 376 U.S. 225, 230 (1964). In other words, a patent’s value is found largely in the idea that nothing else like the product or process exists. *See Grain Processing Corp. v. Am. Maize-Props. Co.*, 185 F.3d 1341, 1350–51 (Fed. Cir. 1999). The novelty induces the purchase, so the value decreases when alternative products exist. *See id.*

These patent principles, however, do not apply with equal force to copyrights. Unlike patents, copyrighted works need only be “original”—not novel. *Feist*, 499 U.S. at 345 (“Originality does not signify novelty.”). And “the requisite level of creativity” for originality is “minimal” or “extremely low.” *Id.* Thus, by inserting originality instead of novelty, copyright law contemplates that many expressions of the same idea will exist.

Because a purchaser does not pay a “novelty premium” for a copyrighted work, the existence of other non-infringing alternatives is irrelevant; it does not affect the copyrighted work’s protection. While the nature of computer software may be somewhat opaque, a simpler example from literature proves the point. If someone infringed the copyright of an author’s mystery novel, we would not reduce the value of his book simply because thousands of other mystery novels exist. In fact, it would be nonsensical to think that the value of that novel depended on how many other mystery novels there were. Instead, we value the novel by the quality of the author’s expression. That principle is no less true in the more complex world of computer software.

Second, we are not convinced that a “non-infringing alternative” to a copyright even exists. Copyrights and patents are not analogous on this point. Imagine an inventor who created a new process for achieving a particular outcome that meets all the requirements for a valid patent. Patent law protects the inventor’s idea, which in our example is a particular process that achieves a specific result. Sometime later, however, another individual discovers an entirely different process for achieving that same result. In that case, we could properly classify the second process as a non-infringing alternative

method for obtaining the desired result.

If we try to import this same sequence into the copyright context, absurd results follow. Consider again our hypothetical author who writes mystery novels. Copyright law does not protect the underlying idea—in this example, the mystery concept itself—but protects the author’s particular expression of that idea (*his or her* mystery novel). For a supposed alternative to be “non-infringing” in the copyright context, then, another person must be able to express the author’s expression without copying that expression. That does not appear possible, yet that is what the law would require.

In the end, while an alternative software product can be a relevant consideration in a hypothetical negotiation, *Gaylord III*, 777 F.3d at 1370, it cannot cap damages in the way that the government asks. In effect, what the government seeks is a “name your own price tool,” through which it can mix and match the software it wants with the price it wants. It would no longer need to pay higher prices for better software because, according to the government, it can just engage in mass copying of its preferred software, and if the copyright owner sues for infringement, it can simply point to a cheaper, unused software and declare that price to be the limit of infringement. We decline the government’s invitation to limit damages in this way.

C. Hypothetical Negotiation

Normally, a copyright owner proves its entitlement to damages under the Copyright Act through evidence of lost sales or diminished copyright value. But when, as here, copyright infringement has not produced lost sales or opportunities or diminished the copyright’s value, damages are instead calculated based on a reasonable license fee, which we determine using a hypothetical negotiation. *Id.* We use this method to prevent the “infringer [from] get[ting] his taking for free” and to ensure that copyright owners are not “left uncompensated for the illegal taking of something of value.” *E.g., On Davis v. The Gap, Inc.*, 246 F.3d 152, 164 (2d Cir. 2001).

In conducting this hypothetical negotiation, we look to the economic realities using the factors suggested in *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116 (S.D.N.Y. 1970). *See Gaylord III*, 777 F.3d at 1367–68 (endorsing the use of objective factors from patent law in copyright cases). We also consider all the relevant facts—not just those known by the parties at the time. *E.g., Sinclair Refin. Co. v. Jenkins Petrol. Process Co.*, 289 U.S. 689, 698 (1933) (explaining how the facts between infringement and trial establish a “book of wisdom that courts may not

neglect”).

We must assume that this negotiation is between a willing buyer and a willing seller. *Gaylord III*, 777 F.3d at 1367. This means that sellers cannot charge what they would like to as if “unconstrained by reality,” *Oracle Corp. v. SAP AG*, 765 F.3d 1081, 1088 (9th Cir. 2014), and buyers cannot simply name a price that they “would prefer to pay,” *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1555 (Fed. Cir. 1995). While we need not assess the license fee with “mathematical exactness,” we must be able to reasonably approximate it. *Gaylord III*, 777 F.3d at 1367. Still, “[s]ome difficulty in quantifying the damages attributable to the infringement should not bar recovery.” *Id.* at 1368.

1. Date of Hypothetical Negotiation

Before we can conduct this hypothetical negotiation, we must first establish when it would have occurred. That is because our hypothetical negotiation is generally limited by the information available to the parties on that date. That said, we can consider some information that would come to light after the hypothetical negotiation. *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1331 (Fed. Cir. 2009) (discussing the book of wisdom). The date of the hypothetical negotiation is the same as the date of first infringement. *LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694 F.3d 51, 75 (Fed. Cir. 2012).

The parties dispute the date of first infringement. According to 4DD, the government installed its first infringing Tetra copy on August 27, 2013. The government disagrees, and claims that its infringement did not begin until several months later around December 2013. Yet again, the government’s spoliation prevents us from answering this question. If it had not destroyed or reimaged the machines containing Tetra, we could determine when it created the first infringing copy. As a result, we presume that this evidence was unfavorable to the government and would have proven that its infringement began on August 27, 2013.

2. Georgia-Pacific Factors

With the date of negotiation now set, our next task is to evaluate the parties’ bargaining strength based on the *Georgia-Pacific* factors. On the one hand, 4DD’s damages expert, Ms. Elizabeth Dean, believes that 4DD holds the superior bargaining position because of Congress’s immense pressure for DOD to solve its interoperability problem and because every Tetra

alternative was more expensive. *See* PTX 905 at 40 (Ms. Dean's Expert Report) (explaining that the next best software cost \$31,197 per core). Ms. Dean does not, however, reference the *Georgia-Pacific* factors nor explain their application to this case.

On the other hand, the government's damages expert, Mr. David Kennedy believes that the government enjoys the superior bargaining position because he contends that the government could have used a cheaper software called Rhapsody and because Tetra has had little economic success. Ultimately, for the reasons below, we agree with Mr. Kennedy that the government holds a significantly stronger bargaining position.

We view three *Georgia-Pacific* factors as most relevant to assessing the hypothetical negotiation's outcome here: (1) the infringer's use of the copyrighted software and its associated value, (2) the "established profitability" of the copyrighted software, and (3) the "rates paid" by the government for the use of other similar software. 318 F. Supp. at 1120. We note that Mr. Kennedy claims that a fourth factor—the commercial relationship between the parties—would apply downward pressure in this hypothetical negotiation. Essentially, he believes that the commercial relationship between 4DD and the government is akin to the relationship between an inventor and a promoter. We disagree and do not believe that this factor has any relevance in the hypothetical negotiation here.

First, most damaging to 4DD's bargaining position is that the government's use of Tetra provided it with little value. Tetra never made it beyond the development stage and, as a result, never solved the government's interoperability problem. In addition, even if Tetra had provided interoperability, it would have been replaced by DHMSM shortly after. In other words, the government had little to no incentive to commit to any long-term use of Tetra. Still, before the government replaced Tetra, it did benefit from its infringing use because it could "easily and rapidly deploy, clone, relocate or restore instances necessary to keep the [DMIX] project on track." PTX 905 at 51; *accord* Tr. 1576 (Miller). Nevertheless, we agree with Mr. Kennedy that this minimal value would have weakened 4DD's bargaining position; the government would not pay billions of dollars for what would have been, at best, an interim solution.

Second, 4DD's Tetra Healthcare Federator has no established profitability. In fact, other than its agreement with the government, 4DD has never sold its healthcare product. Because this project was the product's only source of revenue, we think it is likely that 4DD would feel pressure to

accede to reasonable government demands. *See, e.g.*, Tr. 804 (McPhatter) (explaining that, although 4DD did not have a development license, it would create one for the government); Tr. 273 (Truxillo) (testifying that 4DD would offer an enterprise license); JTX 119 (expressing an “intent to offer unprecedented discounts for the full enterprise use of” Tetra). For this reason, we agree with Mr. Kennedy that 4DD’s lack of commercial success would have weakened its negotiating position.

Finally, we turn to DHMSM, where the government bought a cheaper software called Rhapsody * * * * *. The parties dispute whether Rhapsody can perform the same functions as Tetra. In 4DD’s view, Rhapsody is only an Enterprise Service Bus (ESB) and not a data federator like Tetra. The government agrees that an ESB is different from a federator, but it maintains that an ESB could achieve the same result.

Ultimately, for purposes of the *Georgia-Pacific* factors, we need not decide whether Tetra and Rhapsody performs all the same functions. The evidence shows that ESBs like Rhapsody perform at least some of the same functions as Tetra—even if not all. For that reason, Rhapsody’s lower price and similar functionality would have constrained to some extent 4DD’s ability to make demands in this hypothetical negotiation. Thus, we conclude that these three objective factors demonstrate that the government possesses a substantially superior bargaining position.

3. Royalty Base

The next step is to establish the royalty base. We believe that the proper royalty base is all infringing copies. As stated above, the government created 47,030 infringing copies of Tetra Healthcare Federator that were associated with 290,334 computer cores. In addition, the government also created 41,925 infringing copies of Tetra Studio that were associated with 171,421 seats.

4. Royalty Rate

We now reach the final stage of the hypothetical negotiation—choosing the royalty rate. As part of that effort, we separate the infringing copies into four categories: (1) non-backup copies, (2) backup copies, (3) RAM copies, and (4) Tetra Studio copies. For each group, we believe that the parties would have agreed to a different licensing fee. *See Gaylord II*, 678 F.3d at 1344 (explaining that a hypothetical negotiation may lead to “different license fees” for different categories).

a. Non-Backup Copies

First, for the non-backup copies,²⁰ we conclude that the parties would have agreed to a development license. Typically, development licenses are heavily discounted software versions that are restricted to development (or non-production) use. When software is in the development stage, this reduced cost often outweighs the software's restricted abilities.

Here, using the book of wisdom, the parties know that the government only used Tetra for software development. The project never made it to production, and, given that reality, it would make no economic sense for the government to buy a production license when a significantly discounted development license would suffice. To demand anything more would be unreasonable. *See Oracle Corp.*, 765 F.3d at 1088 (explaining that sellers cannot charge what they "would like to have charged if unconstrained by reality").

Despite this economic reality, 4DD insists that the government unnecessarily buy a more expensive production license. It maintains that it did not offer a development license for Tetra and claims that fact precludes the government from purchasing one. That is not dispositive, however, because 4DD told the government that it would consider creating a development license. It also submitted several development license price quotes along with explanations for how the license would work. *See, e.g.*, PTX 187 at 4 ("Developer licenses are not tied to production licenses[] and can be installed on any number of machines in any combination."); *id.* ("[D]evelopment licenses are restricted to processing only non-production data that's used for development purposes."); *id.* at 5 ("[W]e typically do a direct 90% discount from the production list price."). This evidence, combined with the government's stronger bargaining position, proves that 4DD would have been willing to offer the government a development license.

We also believe this development license would have been assessed on a per-computer-core basis. As Ms. Dean's testimony demonstrated, a license's scope and duration are two important factors that induce a seller to

²⁰ The non-backup copies include deployed virtual machine copies and deployed update copies.

offer an enterprise (or unlimited core) license. Here, however, those factors are both missing as the government terminated its use of Tetra after roughly one year, which eliminated any potential for increased or prolonged deployment. As a result, that licensing structure offers no benefit to 4DD. Thus, for all non-backup copies, a development license assessed on a per-computer core basis makes the most economic sense.

To calculate the non-backup license fee, we begin with the core count. When combined, the non-backup copy categories total 30,604 computer cores. Using that number, we next apply the development license discount. The evidence shows that 4DD discounted its development license by 90% from the production license price of \$24,000 per core. After applying the 90% development license discount, the price comes to \$2,400 per computer core.

With the development license price established, we can now calculate the volume discount.²¹ According to both damages experts, 4DD used the following volume discount formula: $[\text{Base Rate}] \times [\text{Units}]^{(-0.05 \times [\text{Tier Level}])} = [\text{Discounted Rate Per Core}]$. As the exponent in the formula reveals, the volume discount increased with the number of purchased cores. But contrary to Mr. Kennedy's expert testimony, the evidence shows that 4DD only offered four discount tiers. A purchaser obtained this fourth-tier discount when, as here, they bought licenses for at least 64 computer cores. Using the volume discount formula, then, we calculate that the discounted rate per core is \$305.22.²² Thus, at that volume discounted price, the total cost to buy 30,060 Tetra licenses is \$9,174,922.88.

b. Backup Copies

Second, for the backup copies²³—which represent the bulk of 4DD's copyright claim—we are unconvinced that the parties would have agreed to

²¹ During the pricing exercise, 4DD explained that it would apply a volume discount to its development license price if the government also purchased production licenses. Because the government has already purchased 232 production licenses, we apply 4DD's volume discount.

²² $2,400 \times 30,060^{(-0.05 \times 4)} = 305.22$.

²³ The backup copies include the deployed OVA copies, the distribution OVA copies, the full reserve virtual machine copies, and the full backup operating system copies.

a per-computer-core license. That is because any benefit these backup copies offer is far outweighed by the financial cost imposed by a per-core model. Indeed, for this category of copies alone, 4DD demands \$4 billion as compensation. For context, that is \$3.5 billion more than 4DD demands for the copies that the government actually used for testing and development. It is also the same amount that the government allotted for the entire DHMSM project. There is no reality in which that licensing structure makes economic sense.

We therefore conclude that the parties would have agreed to a convenience fee, something that the government acknowledged as a possible solution in its closing argument. During this hypothetical negotiation, the parties know through the book of wisdom that the government intends to generate thousands of backup copies. At the same time, they also understand the unreasonableness of paying \$4 billion under a per-core license. Still, the government needs the right to create these backups because they protect the government's work and enable the development process. *See* Tr. 2153–54 (Schnell) (explaining the importance of backup copies in software development). Thus, a convenience fee strikes the appropriate balance between these competing concerns. Based on the evidence, the economic realities, and the government's superior bargaining position, we conclude that a convenience fee of 20% of the purchase price—or \$1,834,984.57—establishes a fair licensing agreement and represents a reasonable compromise by both parties.²⁴

c. RAM Copies

Third, the evidence proves that 4DD would not have charged the government for RAM copies. Indeed, 4DD admits that it does not charge for RAM copies generated by licensed Tetra copies. It would only change that policy for this negotiation to exploit the government's infringement—not to reach a reasonable licensing agreement. Thus, we conclude that 4DD is not entitled to compensation for any RAM copies.

d. Tetra Studio

Finally, we arrive at Tetra Studio. In the context of a hypothetical negotiation, Tetra Studio presents a challenging hurdle. That is because, on the one hand, the government created 41,925 infringing copies of Tetra

²⁴ \$9,174,922.88 x 0.20 = \$1,834,984.57.

Studio, which Mr. Myers associated with 171,421 seats.²⁵ Yet on the other hand, the SMS team only comprised about 60 employees. That means, in other words, that the government would be buying over 171,000 seat licenses for nonexistent people. Under normal circumstances, that purchase makes no economic sense because a “buyer will not ordinarily pay more for a license than its anticipated benefit.” *Oracle*, 765 F.3d at 1089. Still, regardless of the economic realities, the law requires an artificial negotiation between two willing parties, and the government cannot leave the table.

But even with the government shackled to the negotiating table, 4DD is only entitled to its “reasonable and entire compensation”—not a windfall. 28 U.S.C. § 1498(b). Yet a windfall is what 4DD would receive if—for a team of fewer than 100 people—the government purchased 171,000 licenses on a per-seat basis. These negotiations may be artificial, but they are not irrational, and we do not believe that the law compels the government to pay \$184 million for seat licenses with no value. Instead, we conclude that the government would have paid no more than \$150,000 to compensate 4DD for what would have been willful infringement—an amount equivalent to statutory damages under the Copyright Act.

Thus, in sum, the hypothetical negotiation would have produced the following licensing agreement: (1) for non-backup copies of Tetra Healthcare Federator, the government agrees to pay \$9,174,922.88; (2) for backup copies of Tetra Healthcare Federator, the government agrees to pay a 20% convenience fee or \$1,834,984.57; and (3) for Tetra Studio, the government agrees to pay \$150,000 as compensation for willful infringement.²⁶

²⁵ Once again, we must note a discrepancy between Mr. Myers’s expert testimony and 4DD’s post-trial brief. At trial, Mr. Myers testified that he associated seats with only two categories of Tetra Studio copies: (1) deployed virtual machine copies and (2) deployed update copies. In its brief, however, 4DD appears to disregard its own expert’s testimony about associated seats and instead seeks damages for every Tetra Studio category. In fact, the bulk of 4DD’s Tetra Studio damages claim (79%) rests on full reserve virtual machine copies—a category to which Mr. Myers associated no seats. This departure from Mr. Myers’s testimony also comes with little explanation, and so we decline to follow it.

²⁶ If any imprecision within these damages calculations remains, the

CONCLUSION

4DD has shown that the government infringed its copyright thousands of times over. Conversely, the government failed to prove its affirmative defenses. As a result, 4DD is entitled to these damages:

1. \$9,174,922.88 for all non-backup copies of Tetra Healthcare Federator.
2. \$1,834,984.57 for all backup copies of Tetra Healthcare Federator.
3. \$150,000 for all copies of Tetra Studio.
4. In addition, 4DD is entitled to delay compensation on the entire amount running from the date of first infringement.

The parties are directed to confer and attempt to agree on the final amount of 4DD's judgment, including the correct calculation for delay compensation and any government credit for the true-up payment. To that end, the parties must submit a joint status report on or before September 22, 2023.

s/Eric G. Bruggink
ERIC G. BRUGGINK
Senior Judge

government cannot complain when its wrongful actions “prevent[] a more precise computation.” *Bigelow v. RKO Radio Pictures*, 327 U.S. 251, 264 (1946). Indeed, “[a]ny other rule would enable the wrongdoer to profit by [its] wrongdoing at the expense of [its] victim.” *Id.*